

## Claims

1. Cathode for high-temperature fuel cell comprising a cathode material with the chemical composition according to the formula  $\text{Ln}_{1-x-y} \text{M}_y \text{Fe}_{1-z} \text{C}_z \text{O}_{3-\delta}$

5 wherein

$$0.02 \leq x \leq 0.05,$$

$$0.1 \leq y \leq 0.6,$$

$$0.1 \leq z \leq 0.3,$$

$$0 \leq \delta \leq 0.25$$

10 and wherein Ln = lanthanide, M = strontium or calcium and C = cobalt or copper, wherein the cathode has an average grain size in the range of 0.4 to 1.0  $\mu\text{m}$ .

15 2. The cathode according to claim 1 wherein  $0.3 \leq y \leq 0.5$ , especially wherein  $y = 0.4$ .

3. The cathode according to one of claims 1 to 2 wherein  $0.15 \leq z \leq 0.25$ , especially wherein  $z = 0.2$ .

4. The cathode according to one of claims 1 to 3 wherein Ln = lanthanum.

20 5. The cathode according to one of claims 1 to 4 wherein M = strontium.

6. The cathode according to one of claims 1 to 5 wherein  
C = cobalt.

7. The cathode according to one of claims 1 to 6  
comprising  $\text{La}_{0.58}\text{Sr}_{0.4}\text{Fe}_{0.8}\text{Co}_{0.2}\text{O}_{3-\delta}$ ,  $\text{La}_{0.55}\text{Sr}_{0.4}\text{Fe}_{0.8}\text{Co}_{0.2}\text{O}_{3-\delta}$ ,  
5  $\text{La}_{0.78}\text{Sr}_{0.2}\text{Fe}_{0.8}\text{Co}_{0.2}\text{O}_{3-\delta}$  or  $\text{La}_{0.58}\text{Sr}_{0.4}\text{Fe}_{0.8}\text{Cu}_{0.2}\text{O}_{3-\delta}$ .

8. The cathode according to one of claims 1 to 7,  
wherein the cathode has an average grain size in the range of 0.6  
to 0.8  $\mu\text{m}$ .

9. The cathode according to one of claims 1 to 8 wherein  
10 a porosity is equal to between 20 and 40%, especially between 25  
and 35%.

10. A method of preparing a cathode according to one of  
claims 1 to 9 comprising the steps of:

applying and sintering onto an anode-electrolyte  
15 composite a  $(\text{Ce}, \text{Gd})\text{O}_{2-\delta}$  powder with an average grain size of less  
than 0.8  $\mu\text{m}$  such that a  $(\text{Ce}, \text{Gd})\text{O}_{2-\delta}$  intermediate layer results,

applying and sintering onto this intermediate layer a  
cathode material with the chemical composition according to the  
formula  $\text{Ln}_{1-x-y}\text{M}_z\text{Fe}_{1-z}\text{C}_x\text{O}_{3-\delta}$  wherein

20  $0.02 \leq x \leq 0.05,$

$$0.1 \leq y \leq 0.6,$$

$$0.1 \leq z \leq 0.3,$$

$$0 \leq \delta \leq 0.25$$

and wherein Ln = lanthanide, M = strontium or calcium and C = cobalt or copper as powder with an average grain size of less than 2  $\mu\text{m}$ .

11. The method according to claim 10 wherein the cathode material is applied as powder with an average grain size between 0.6 and 0.8  $\mu\text{m}$ .

12. Use of a cathode according to one of claims 1 to 9 in a fuel cell, wherein the cathode is arranged adjacent to a (Ce, Gd) $\text{O}_{2-\delta}$  intermediate layer with a porosity of less than 30%.